UC SOUTHERN REGIONAL LIBRARY FACILITY
D 000 941 441 8

Aeronautica

or

The History of Aviation and Aerostation

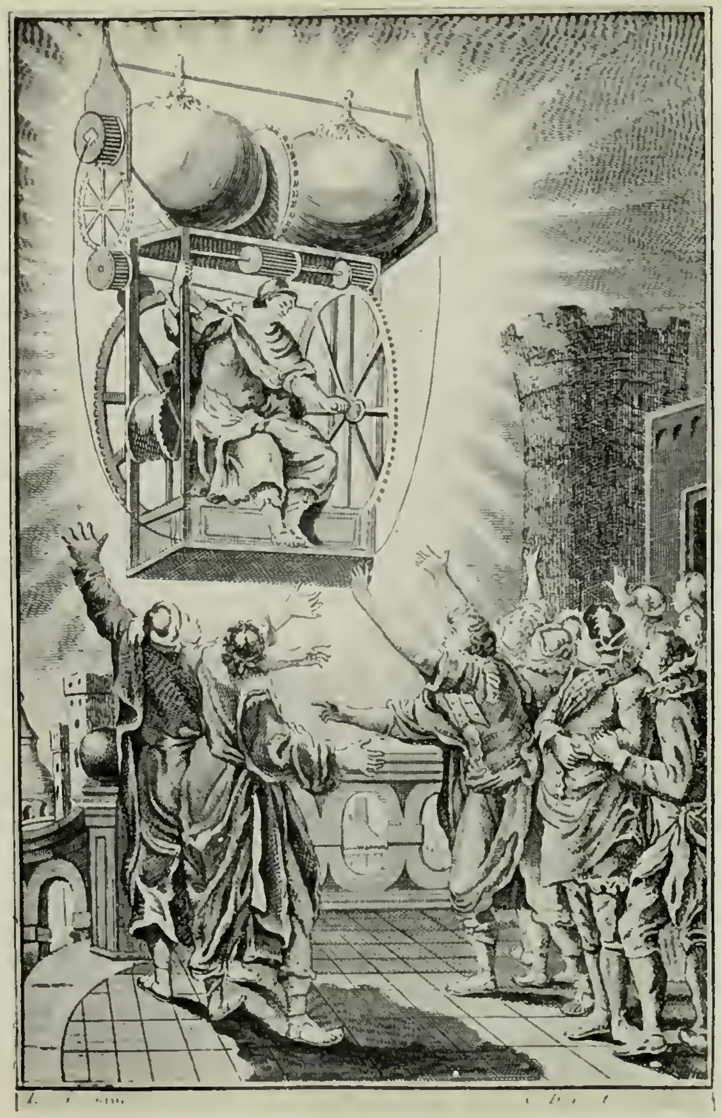
Told in

Contemporary Autograph Letters, Books,
Broadsides, Drawings, Engravings, Manuscripts, Newspapers, Paintings, Posters,
Press Notices, Etc.

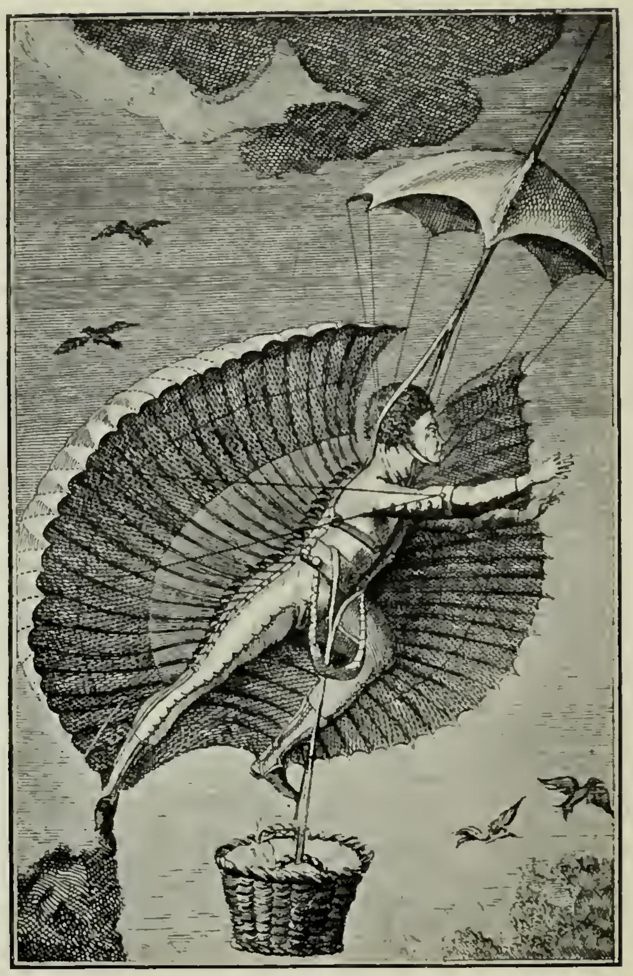
Dating from the Year 1557 to 1880

Not printed for sale

92682



No. 43. [La Folie] (*see* Catalogue).



No. 76. [Rétif] (*see* Catalogue).

Aeronautica

AS a preface to the Catalogue of this extremely important and intensely interesting Collection, a brief survey of the History of the subject may be acceptable to those interested therein, in order that an adequate idea of the importance and unique nature of its contents may be easily grasped.

Briefly, AERONAUTICS means THE ART OF NAVIGATING THE AIR.

There are two branches :—

1. AEROSTATION, dealing properly with machines which, like balloons, are lighter than air, and—

2. AVIATION, dealing with the problem of artificial flight by means of flying machines which, like birds, are heavier than air, and also with attempts made to fly by human beings having wings fitted to their limbs.

Historically, AVIATION is the older, and in legendary history men and animals are supposed to have travelled through the air (such as Pegasus, Medea's Dragons, and Dædalus), and in the Egyptian bas-reliefs wings are depicted as the means by which aerial locomotion is supposed to have been effected.

There are stories of men who, in later times, have attempted to fly in the same way. (SEE ILLUSTRATION.)

John Wilkins (1614–1672), one of the Founders of the Royal Society and Bishop of Chester, discussed the probability of reaching the Moon by volitation. (SEE ILLUSTRATION.)

In his book upon "Mathematicall Magic" (a fine uncut copy of which is in the present Collection) there is a passage stating that a certain English monk named Elmerus, who lived about Edward the Confessor's time, is supposed to have flown from St. Mark's, Venice, and also from Nuremberg.

Giovanni Battiste Dante of Perugia is also said to have flown several times across Lake Trasimere.

In the sixteenth century an Italian alchemist undertook to fly from Stirling Castle, in Scotland, to France, and actually attempted to do so, but fell to the ground and broke his thigh-bone. This accident the daring alchemist explained by saying that the wings he employed were made partly of fowl's feathers, which, said he, had an affinity for the dung hill; whereas, had the wings been made entirely of eagle's feathers, they would have been attracted upwards.

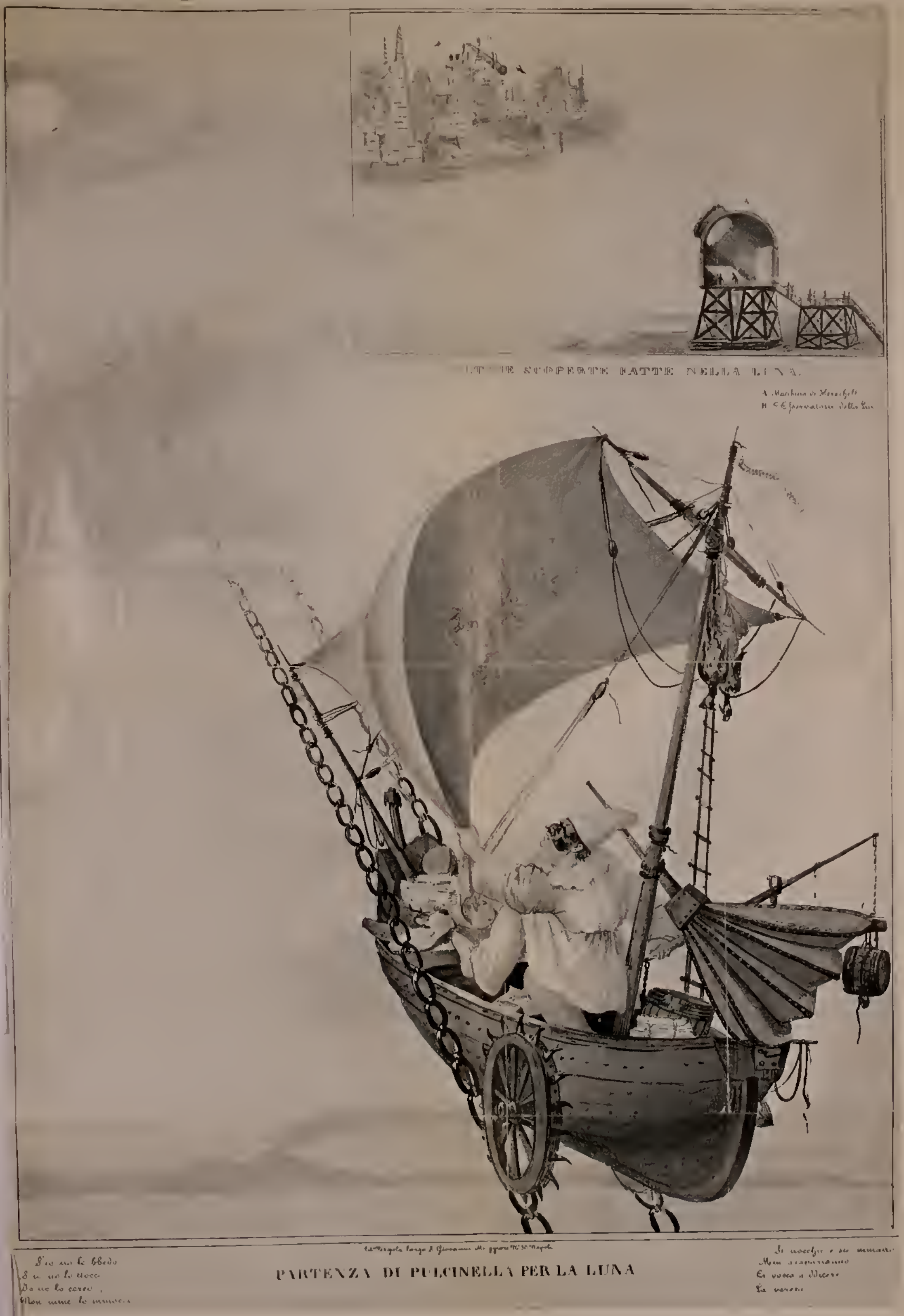
About the same period the great painter, Leonardo da Vinci, approached the problem in a more scientific spirit, and his notebooks contain several sketches of wings to be fitted to the arms and legs.

A lecture by Fleyden in 1617 incited a poor Monk to attempt to put the theory of flying, by means of artificial wings, into practice. His machinery, however, broke down in the attempt, and the unfortunate Monk was killed.

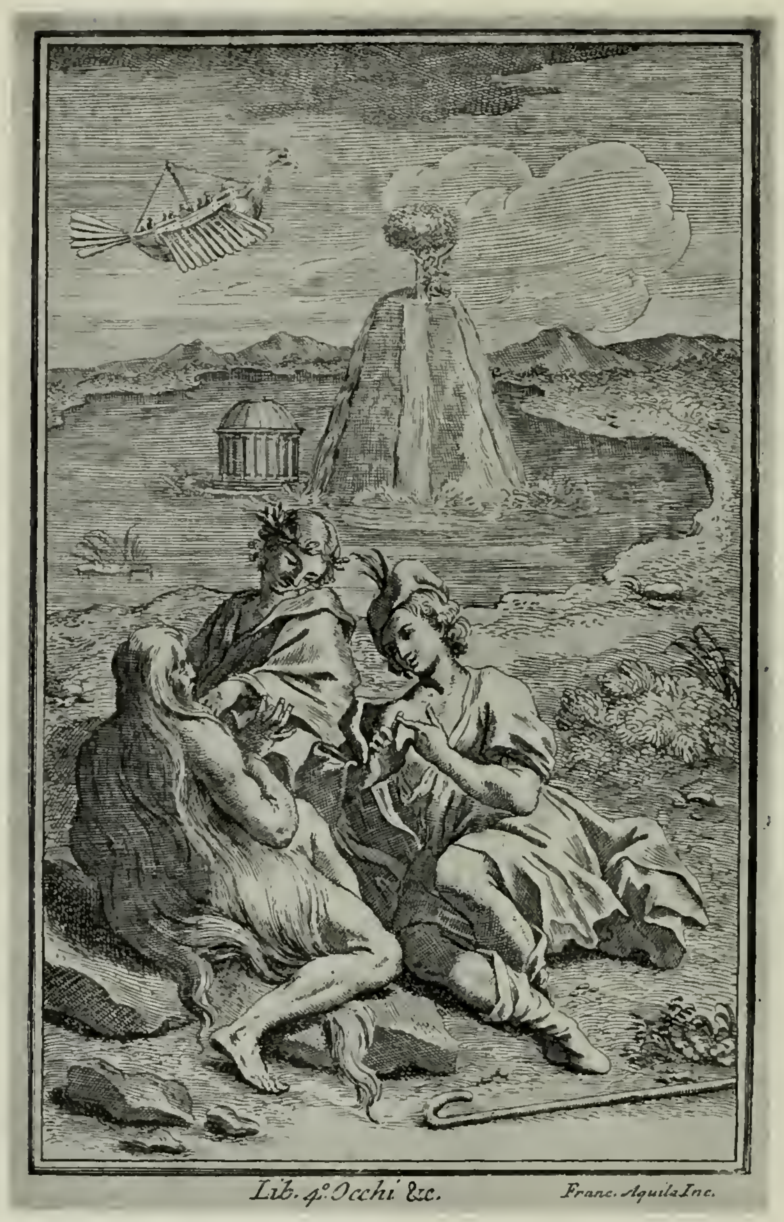
Francis Bacon (the famous author and James I's Lord Chancellor), in his "Silva Sylvarum," referred to the Art of Flying in two extremely curious passages. A copy of the First Edition of this important book is incorporated in the present Collection.

Borellus, in his important work "De Motu Animalium," published at Rome in 1680–81, refuted the possibility of human beings flying by means of artificial wings. He gave calculations of the enormous strength of the muscles in birds, and pointed out the impossibility of man being able, by muscular strength, to give motion to wings of sufficient extent to keep him suspended in the air.

A copy of this rare book by Borellus is also in this Collection.


SCOPERTE FATTE NELLA LUNA.
A Machina di Herschell
B Osservatorio della Luna
PARTENZA DI PULCINELLA PER LA LUNA

A Voyage to the Moon.
No. 307 (*see* Catalogue).


Lib. 4.° Occhi &c.
Franc. Aquila Inc.

No. 39. MARTELLO (*see* Catalogue).

During the lifetime of that learned Author, however, two Frenchmen are said to have succeeded in making short flights.

Possibly the flying dove of Archytas of Tarentum, who lived 500 B.C., is the earliest suggestion of true AEROSTATION. According to Aulus Gellius ("Noctes Atticarum") this was a "model of a dove or pigeon formed in wood, and so contrived as, by a certain mechanical art and power, to fly, so nicely was it balanced by weights and put in motion by hidden and enclosed air."

This hidden air may conceivably represent an anticipation of the hot-air balloon.

Aulus Gellius' book, containing the description of the flying dove of Archytas, is also comprised in this Collection.

The illustration here inserted shows a flying boat with a bird's head. It is taken from the copy of the very rare work by Martello in the Collection.

In the Middle Ages vague ideas appear to have prevailed concerning some ethereal substance so light that vessels containing it would remain suspended in the air.

Roger Bacon conceived of a large hollow globe, made of very thin metal and filled with ethereal air or liquid fire, which would float on the atmosphere like a ship on water.

Similar speculations were advanced by Albert of Saxony, Francis Mendoza and Gaspar Schott.

A little book by Roger Bacon, printed in 1557, is in this Collection. In view of the existence of present day Aeroplanes this tiny volume is of the utmost importance. The passage regarding AVIATION is distinctly prophetic. The volume in question appears to have escaped the notice of all writers upon Aeronautics, and the remarkable passage just mentioned is as follows: "Machines can be made for flying—the man being seated in the middle would work an engine controlling artificial wings. These wings would then beat the air in the manner of a flying bird."

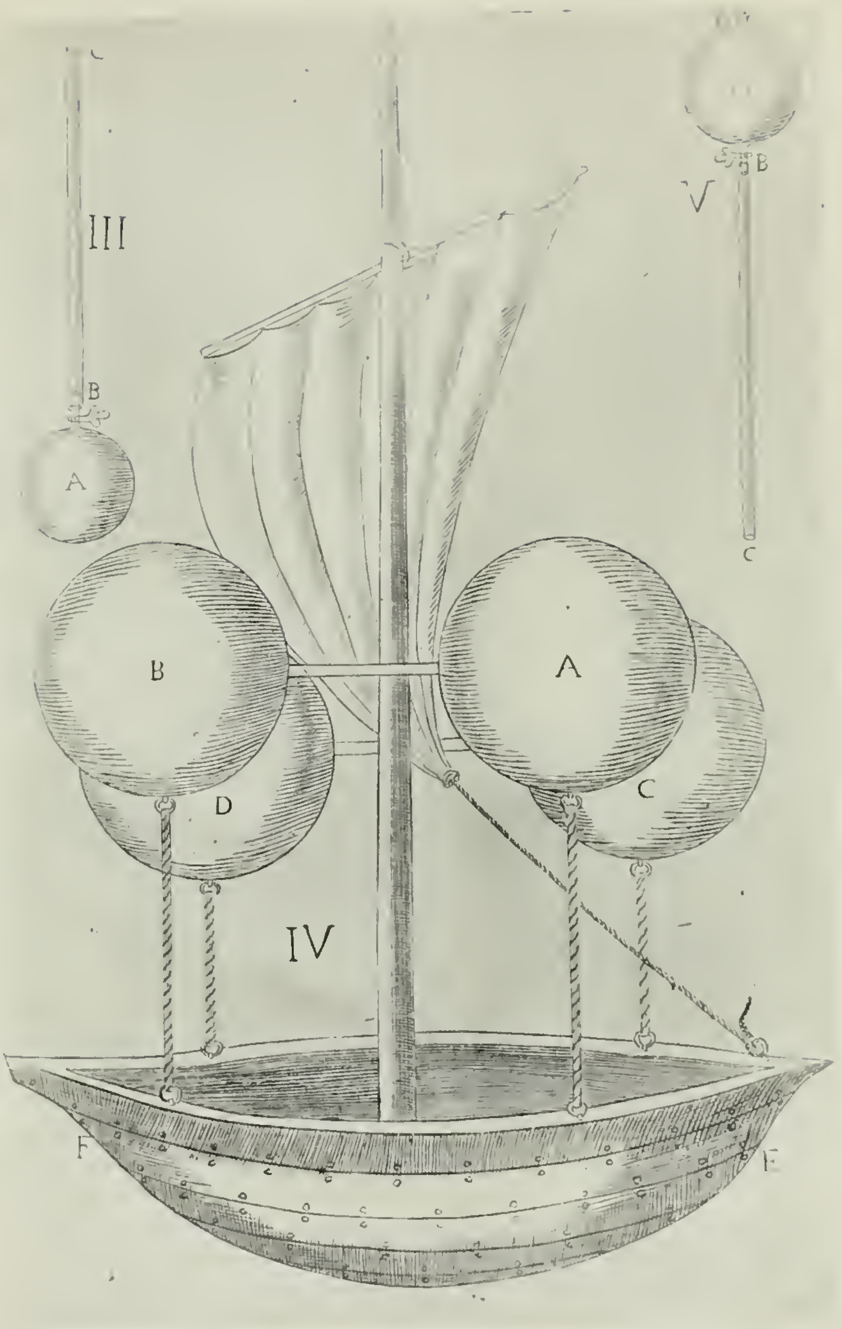
Roger Bacon lived *circa* 1214–1294.

A decided advance upon Aerial Navigation was made by the scheme proposed by the Jesuit, Francis Lana, in his book "Prodromo," published at Brescia in 1670. His idea, though impractical, involved sound principles, which can be said of no earlier attempt. Lana proposed to construct four hollow metal balls of very large dimensions, yet so thin that when the air was exhausted from them they would be lighter than the air they displaced, and would therefore rise. To these balls a boat with sails, etc., was to be attached, which would carry a man. The globes were to be 25 feet in diameter and $\frac{1}{225}$ of an inch thick. This, he said, would give a total ascensional force of 1,200 lbs., enough to raise the entire apparatus and passengers. The obvious objection to the whole scheme is that the construction of globes of so large a size and such thinness to support their own weight, is impossible. His book—which forms the Corner Stone of an Aeronautical Library—is very rare, and contains a full-page copper-cut of his remarkable airship. (SEE ILLUSTRATION.) A very fine copy in its original vellum binding is included in the Collection.

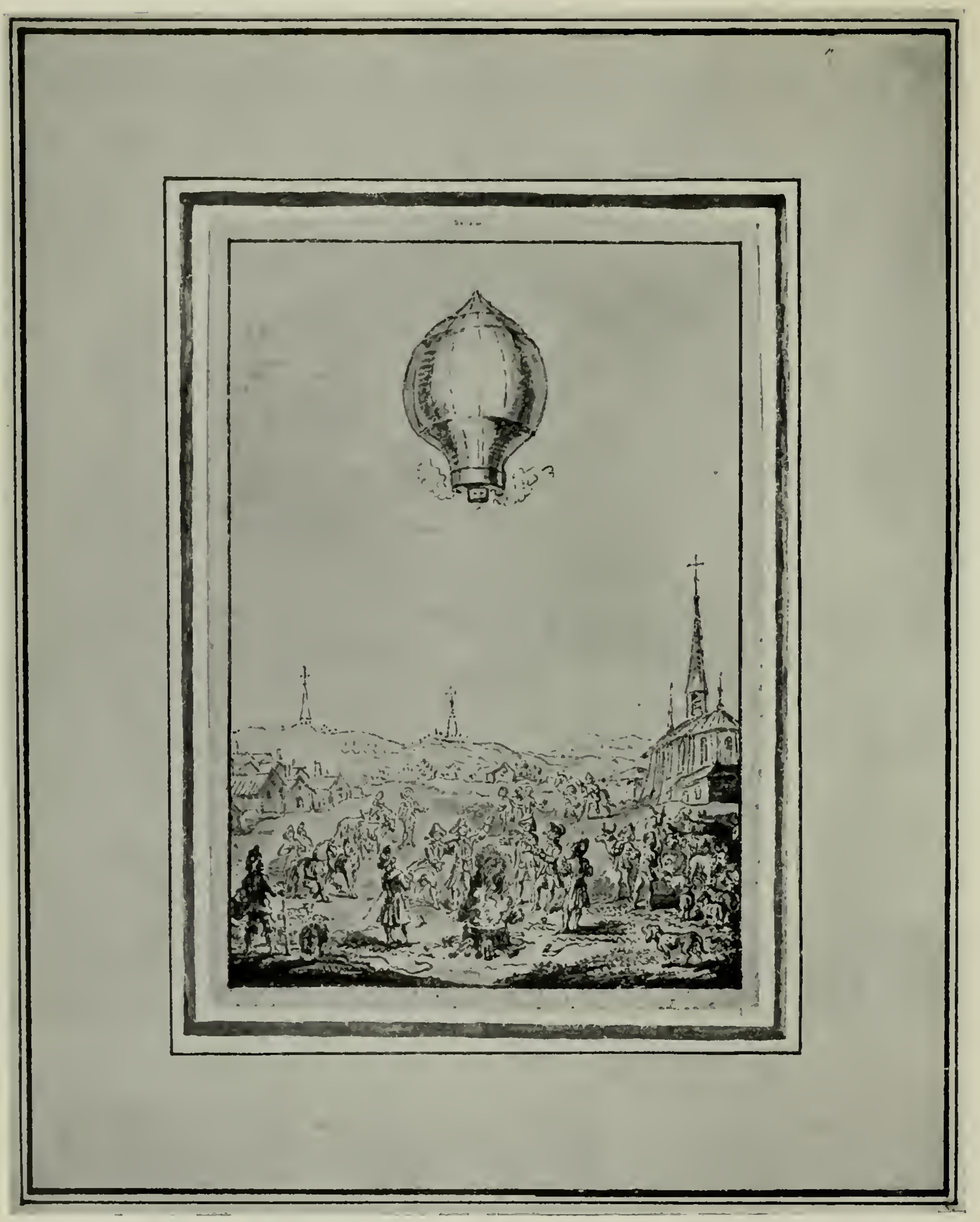
As late as 1755, Joseph Galien proposed to collect the diffuse air of the upper regions, and to enclose it in a huge vessel extending more than a mile every way, and intended to carry 54 times as much weight as the Biblical Noah's Ark!

Cyrano de Bergerac, in his *Romances*, describes journeys to the Sun and Moon—his traveller being wafted thither by a multitude of very thin flasks filled with the morning dew and fastened round his body, the attractive heat of the sun's rays upon the dew elevating him to the middle regions of the atmosphere.

These curious *Romances* are also in the Collection.



No. 33. Lana (*see* Catalogue).



No. 116. Fokké (*see* Catalogue).

Until the appearance of Jean Michel Montgolfier, however, the problem of AEROSTATION remained unsolved.

This man, together with his brother Jacques Etienne Montgolfier, were the inventors of the Balloon. They were the sons of a large paper-maker at Annonay in France.

The brothers had observed the suspension of clouds in the atmosphere, and it had occurred to them that if it were possible to enclose any vapour of the nature of a cloud in a very large light bag the whole might ascend into the air.

Towards the end of 1782, therefore, the two brothers inflated bags with smoke from a fire placed underneath, and found that either the smoke or some vapour emitted from the fire did ascend and carried the bag with it.

Thus assured of the soundness of their discovery, the Brothers Montgolfier determined to hold, on a large scale, the public ascent of a Balloon. Therefore, on the 5th June 1783, in the presence of a considerable concourse of people, a linen globe of 105 feet in circumference was inflated over a fire fed with small bundles of chopped straw.

When released the linen globe rapidly rose to a great height, and descended, at the expiration of ten minutes, at a distance of 1½ miles. This was the invention of the Balloon.

The Brothers Montgolfier thought that the Balloon ascended because of the levity of the smoke or vapour given forth by the burning straw.

It was not until some time later that the ascending power was recognised as the heated atmosphere proving lighter than the air of lower temperature. When the air cooled, the Balloon, therefore, descended.

An original drawing, in sepia, by Simon Fokké, depicting this, the first Balloon-Montgolfier ascent, is in the Collection. (SEE ILLUSTRATION.)

The news of the Montgolfier experiment attracted considerable attention at Paris, so much so, that Barthélemi Faujas de St. Fond, afterwards professor of geology at the Musée d'Histoire Naturelle, started a subscription for paying the expense of repeating the experiment.

The Balloon for this (the second) experiment was constructed by two brothers named Robert under the superintendence of the physicist J. A. C. Charles.

The first suggestion was to copy the Montgolfier process, but Charles proposed the application of hydrogen gas instead of heated air, and this suggestion was adopted.

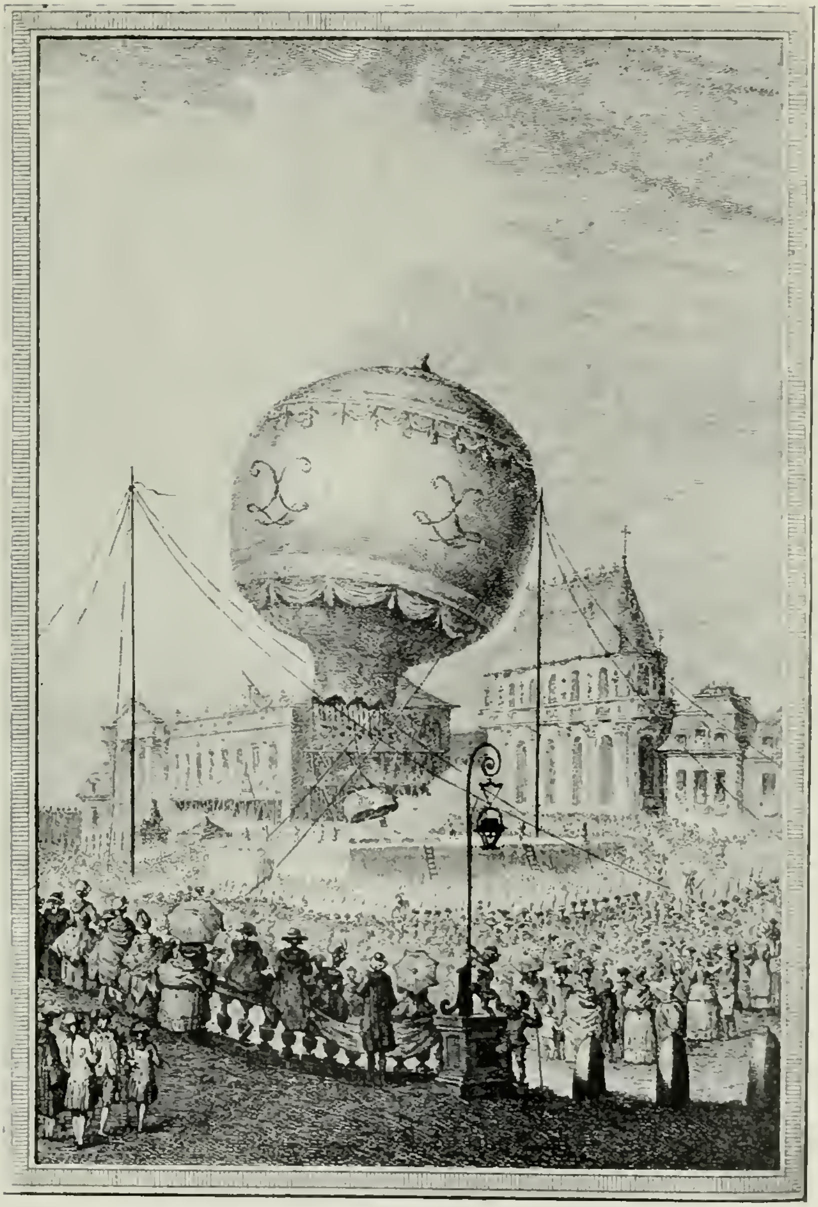
The inflation of the Balloon, which was made of thin silk varnished with a solution of elastic gum, and measured about 13 feet in diameter, was begun on the 23rd August 1783 at Paris in the Place des Victoires. The filling took days to accomplish and bulletins were issued daily of the progress made.

The crowd, however, became so great that on the 26th August the Balloon was secretly removed by night to the Champ de Mars, a distance of two miles.

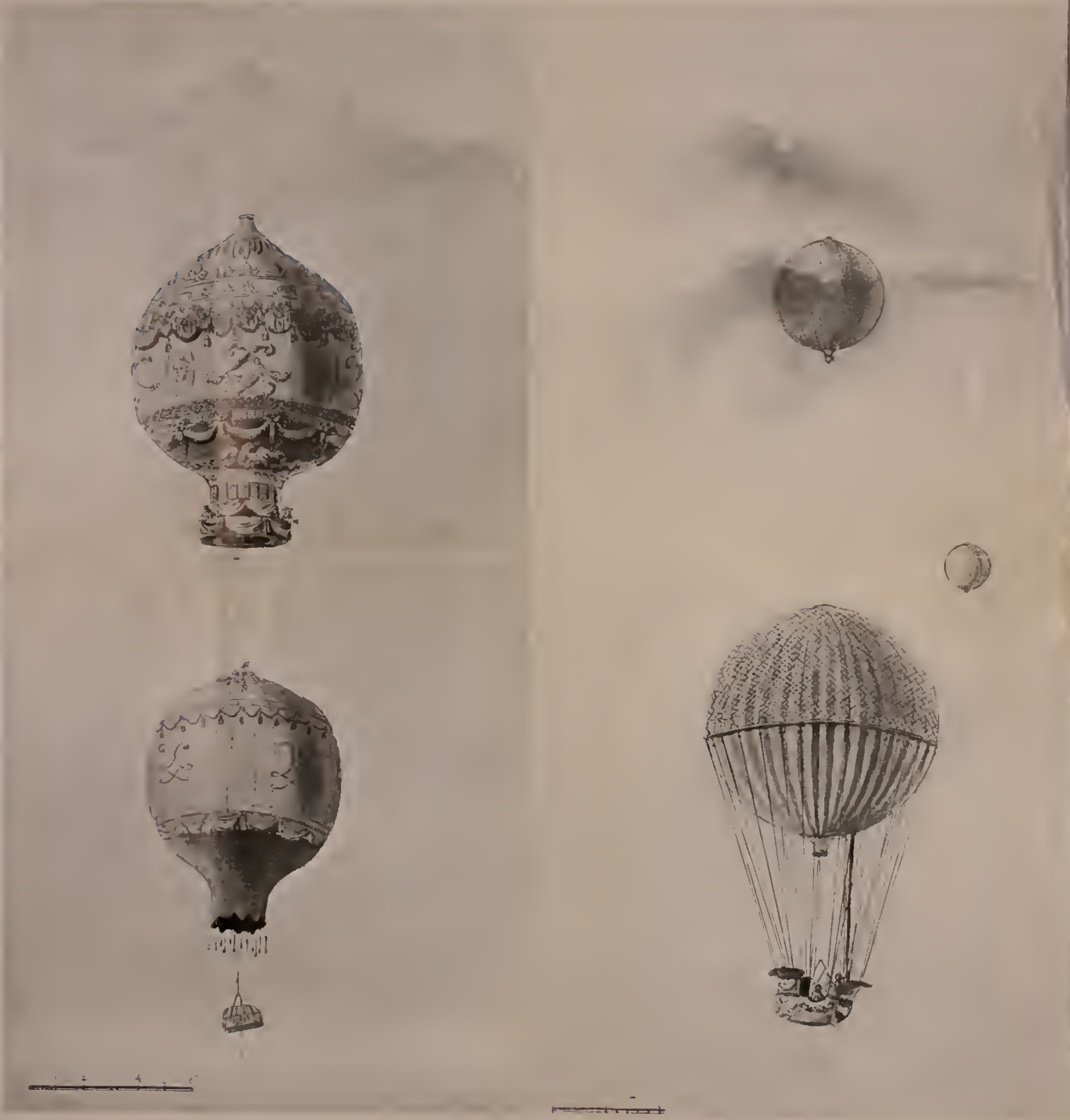
About five o'clock the next day, before an immense multitude, the firing of a cannon gave the signal for the ascent, and the liberated Balloon rose to a height of 3,000 feet with great rapidity. A shower of rain in no way checked its progress.

After remaining in the air for three-quarters of an hour the Balloon fell into a field at Gonesse, about fifteen miles away, and terrified the peasantry so much that it was torn into shreds by them.

A very rare and curious contemporary coloured engraving depicting the ascent is in the Collection. There is also included a brilliant impression of the splendid portrait of Monsieur Charles engraved by S. C. Miger, the King's engraver. Moreover, Faujas de St. Fond's important book, "Description des Expériences de la Machine



No. 44. Faujas de St. Fond (*see* Catalogue).



No. 121. Montgolfier's Balloons (*see* Catalogue)

Aérostatique de MM. Montgolfier," with its charming engravings by De Launay, is likewise in the Collection. (See Illustration.)

In the same year (1783) the Brothers Montgolfier repeated their Annonay experiment at Versailles. This time, however, a cage was suspended from the Balloon, into which were placed a sheep, a cock, and a duck. These were thus the first aerial travellers. The Balloon descended quite safely and the travellers were uninjured.

The Balloon which conveyed these unwilling travellers possessed a very gaudy appearance, being elaborately painted in oil-colours.

A very fine Original Drawing in water-colours of five of the earliest Balloons, among which is the one just described, is in this Collection. (See Illustration.)

The first human being to ascend in a balloon was J. F. Pilâtre de Rozier, a native of Metz.

On the 15th October 1783, and the following days, he made several ascents, generally alone (with but one exception, when his companion was Girond de Villette) in a *captive* Balloon. Pilâtre de Rozier demonstrated that there was no difficulty in taking up fuel for feeding the fire, which was kindled in a brazier suspended from beneath the balloon when in the air.

An early engraving showing the Balloon with the brazier beneath is in the Collection.

On the 21st November 1783 Pilâtre de Rozier and the Marquis d'Arlandes trusted themselves to a *free* fire Balloon (*i.e.*, a Balloon filled with the heated air from a fire), and were therefore the first to make an aerial *voyage*.

They descended safely beyond the Boulevards of Paris, about four miles from the starting place.

A fine original water-colour drawing of this ascent is in the Collection.

Ten days later, Monsieur Charles ascended in a Balloon inflated with hydrogen.

One of the brothers, Robert (by whom the Balloon was constructed), took part in the ascent.

The Balloon ascended from the Tuileries and reached a height of about 2,000 feet. It descended two hours later at Nesle, 27 miles from Paris.

Robert left the car, and Charles made a second ascent alone. (See Illustration.) Thus greatly lightened, the Balloon rose rapidly to a height of two miles, and remained in the air for half an hour, eventually descending three miles away.

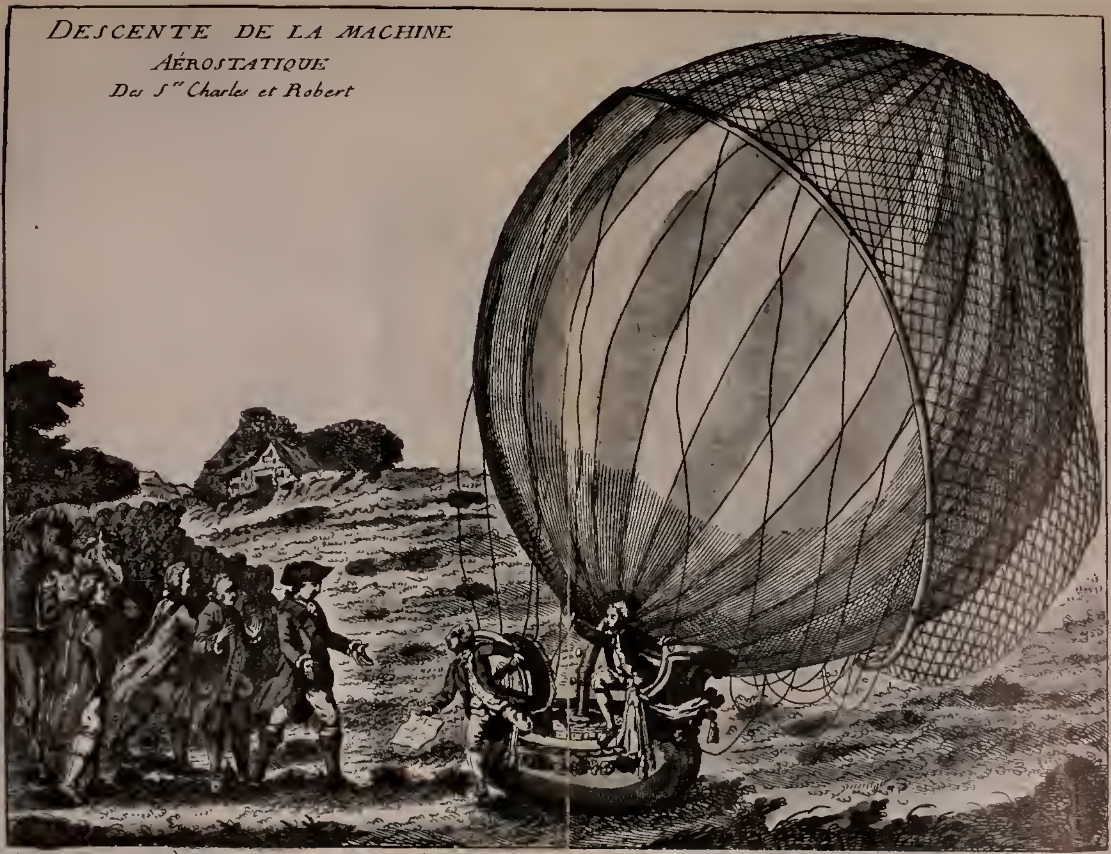
All the accessories of the Balloon in use at the present time are more or less due to Charles, who invented the valve at the top and suspended the car from a hoop, which was itself attached to the Balloon by netting.

With regard to the use of hydrogen gas, Henry Cavendish in 1766 demonstrated that it was seven times lighter than air, and Dr. Joseph Black considered that a thin bag filled with the gas would rise to the ceiling of a room.

A similar idea occurred to Tiberius Cavallo, and the year before the invention of the Brothers Montgolfier he had succeeded in elevating soap bubbles by inflating them with hydrogen gas.

Researches on the use of gas for inflating Balloons appear to have been carried out at Philadelphia almost simultaneously with the experiments of the Brothers Montgolfier; therefore, when the news of the latter reached America, Dr. Rittenhouse and F. Hopkinson, members of the Philosophical Society of Philadelphia, constructed a machine consisting of 47 small hydrogen gas Balloons attached to a car or cage.

After several preliminary captive experiments, in which certain



DESCENTE DE LA MACHINE
AÉROSTATIQUE
Des S^{rs} Charles et Robert

EXTRAIT DU PROCÈS VERBAL. Ce Globe fut enlevé le 1.^{er} Décembre 1783 à une heure 40. minutes dans le Jardin du Palais des Thuilleries, et est descendu à 3 heures 3 quarts dans une Plaine, entre Nesle et Hedouville pres Beaumont M.^{r} le Duc de Chartres et plusieurs Seigneurs arriverent à l'instant de sa descente, où se trouverent les Curés de Nesles d'Hedouvilles et d'autres personnes qui ont signés le Procès Verbal. M.^{r} Charles est reparti a 4 heures et un quart dans la même Machine en présence des mêmes temoins.

No. 45. CHARLES ([illegible] Catalogue)

animals were placed in the car, a carpenter, Jas. Wilcox, was induced for a small sum of money to enter the car.

The ropes were cut and he remained in the air ten minutes, and only effected his descent by cutting incisions in a number of the Balloons through fear of falling into the river which he was approaching.

Not until five months after the experiments of the Brothers Montgolfier was any attempt at Aerostation made in England.

In November 1783, Count Francesco Zambeccari, an Italian who happened to be in London, made a Balloon of oil-skin, ten feet in diameter and weighing eleven pounds. It was publicly shown for a few days and then inflated three-quarters full with hydrogen.

The Balloon left the Artillery Ground at one o'clock, and descended two and a half hours later near Petworth in Sussex, forty-eight miles from London.

This was the first ascent from English ground.

Three important works by Count Zambeccari are in the Collection.

In February 1784 another hydrogen-gas Balloon ascended from Sandwich, in Kent, and descended at Warneton, in French Flanders, 75 miles distant. This was the first Balloon to cross the Channel.

The first person to ascend from British ground appears to have been J. Tytler, who ascended from the Comely Gardens, Edinburgh, on 27th August 1784, in a fine Balloon of his own construction.

He descended on the road to Restalrig about half a mile from where he started.

Vincent Lunardi, however, is generally considered as having introduced Aerostation into Great Britain. Although Tytler had precedence by a few days, his attempt and partial success remained practically unknown, whereas Lunardi's experiments excited an enormous amount of enthusiasm in London.

Lunardi was secretary to Prince Caramanico, the Neapolitan Ambassador.

His Balloon measured 33 feet in circumference, and was exposed to the public view at the Lyceum (in the Strand), and upwards of 20,000 people inspected it.

Lunardi ascended from the Artillery Ground, taking with him a pigeon, a dog, and a cat.

The Balloon was provided with oars, by means of which he hoped to raise and lower himself at leisure.

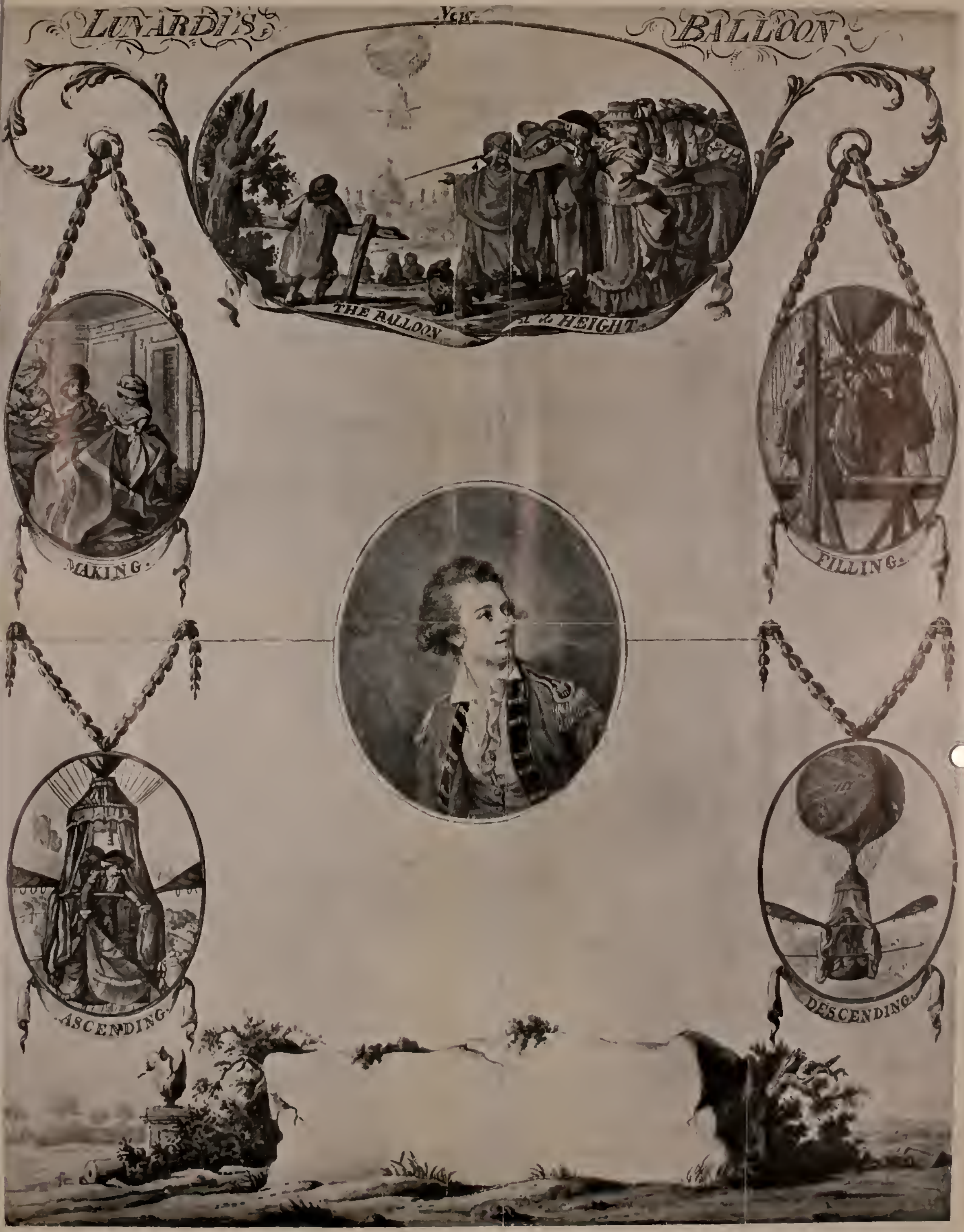
Shortly after starting the pigeon escaped, and one of the oars broke and fell to the ground. In about one and a half hours Lunardi descended at South Mimms, in Hertfordshire, and landed the cat, which had suffered from cold. He then ascended again and descended after the lapse of three-quarters of an hour at Standon near Ware. There the Aeronaut had great difficulty in inducing the peasants to come to his assistance, but at length a young woman, taking hold of one of the cords, persuaded the men to come to his aid.

The excitement caused was immense, and Lunardi was presented to the King (George III).

Various other ascents by Lunardi followed.

There is a magnificent contemporary drawing in water-colours in the present Collection—which is in all probability the work of the famous artist, Wheatley. It illustrates (1) the making of Lunardi's Balloon, (2) its inflation and (3) ascent, (4) the Balloon at its height and (5) descent. (SEE ILLUSTRATION.) There is, moreover, a very early trial-proof of the stipple engraving (by Bartolozzi) known as "The Aerial Travellers" (in which Lunardi, Mrs. Sage, and M. Biggin are seen in the car of a Balloon), with an inscription in manuscript, probably in Bartolozzi's handwriting.

The first ascent from Ireland was made by a Mr. Crosbie on



No. 126. Wheatley (see Catalogue).

19th January 1785, who, on the following 19th July, attempted to cross the St. George's Channel but fell into the sea.

The second person who ascended from Ireland was Richard Macguire.

Mr. Crosbie inflated his Balloon on the 12th May 1785, but it was unable to take him up, and Macguire offered himself as a substitute. His offer being accepted Macguire made the attempt, for which he was knighted by the Lord Lieutenant.

Another attempt to cross the St. George's Channel was made by James Sadler on the 1st October 1812. He had nearly succeeded when a change of wind caused him to descend into the sea at Liverpool. Sadler was rescued by a fishing boat.

However, on 22nd July 1817, his second son, Windham Sadler, succeeded in crossing from Dublin to Holyhead.

The first Balloon voyage across the English Channel was accomplished by Jean Pierre Blanchard and Dr. J. Jeffries, an American physician, on 7th January 1785.

In the preceding year Blanchard, who was one of the most celebrated of the earlier Aeronauts, made his first voyage from Paris and descended at Billancourt near Sèvres.

Just as the Balloon was about to start, a young man jumped into the car and, drawing his sword, declared his intention of accompanying Blanchard. He was ultimately removed by force.

In their Channel crossing Blanchard and his companion started from Dover. When about one-third across the Channel they found themselves descending, and were obliged to throw out every available thing from the car.

All went satisfactorily until the intrepid Aeronauts were about three-quarters across, when they found themselves again descending. Blanchard and his companion therefore threw out not only the anchor and cords, but also part of their clothing, after which the Balloon ascended.

They descended safely in the Forest of Guinnes.

On the 15th June 1785, Pilâtre de Rozier attempted to cross the Channel in the reverse direction from Boulogne.

For this purpose he designed a double Balloon—a fire Balloon, 10 feet in diameter, being placed beneath a gas Balloon of 37 feet in diameter, so that by increasing or diminishing the fire in the former it might be possible to descend or ascend without waste of gas.

Rozier was accompanied by P. A. Romain, and for rather less than half an hour after the Aerostat had ascended all appeared to be going well, when suddenly the whole apparatus was seen in flames and the unfortunate adventurers fell to the ground from a supposed height of more than 3,000 feet.

Rozier was killed on the spot, and Romain only survived ten minutes. A monument was erected on the place where they fell, which was near to the seashore.

A rare contemporary engraving of this monument is in the Collection.

The largest Balloon on record (according to contemporary accounts) ascended from Lyons on 19th January 1784.

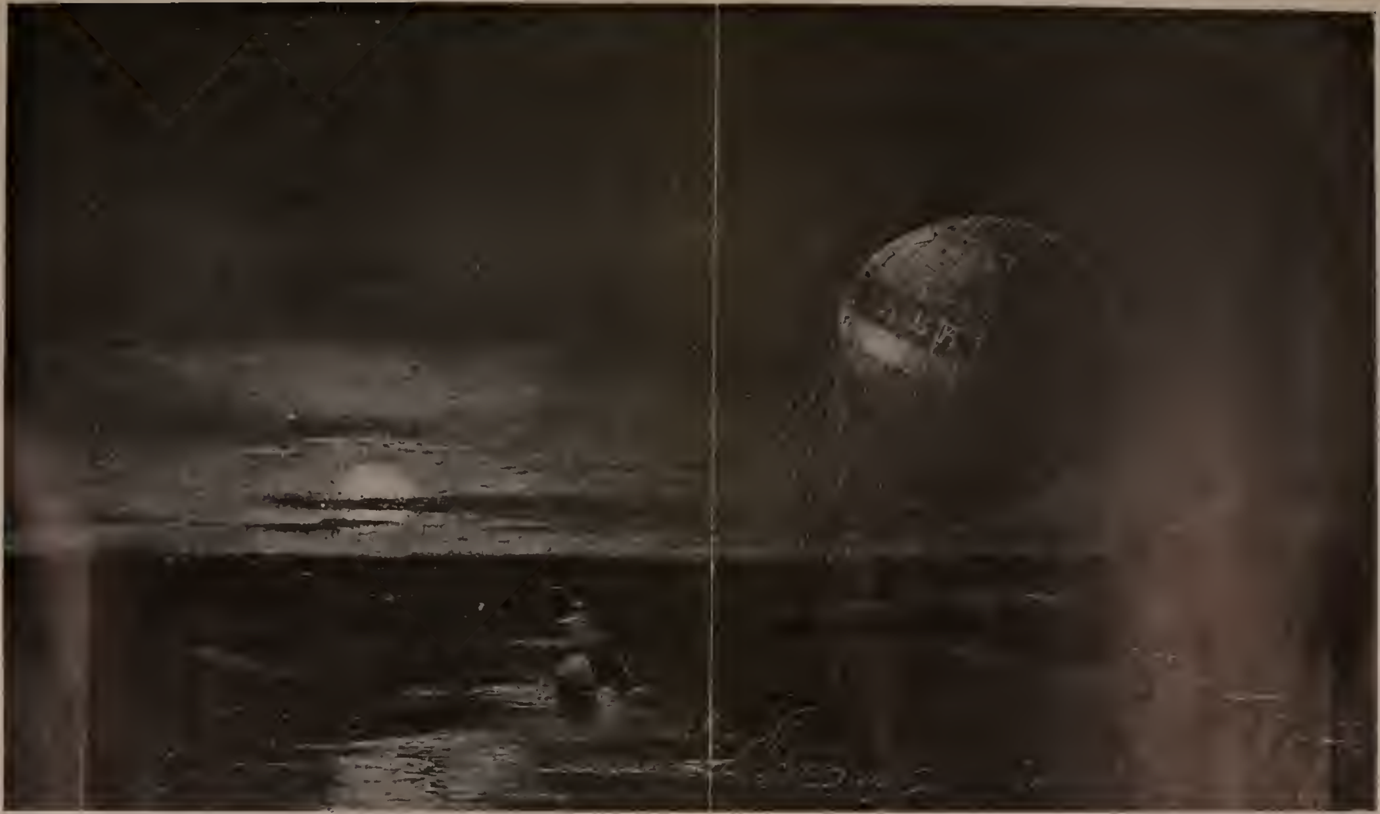
It measured more than 100 feet in diameter and about 130 feet in height. This Balloon was called the "Flesselles."

After being inflated from a straw fire it rose to a height of 3,000 feet with seven persons in the car, and descended after a quarter of an hour owing to a rent in the upper part of the Balloon.

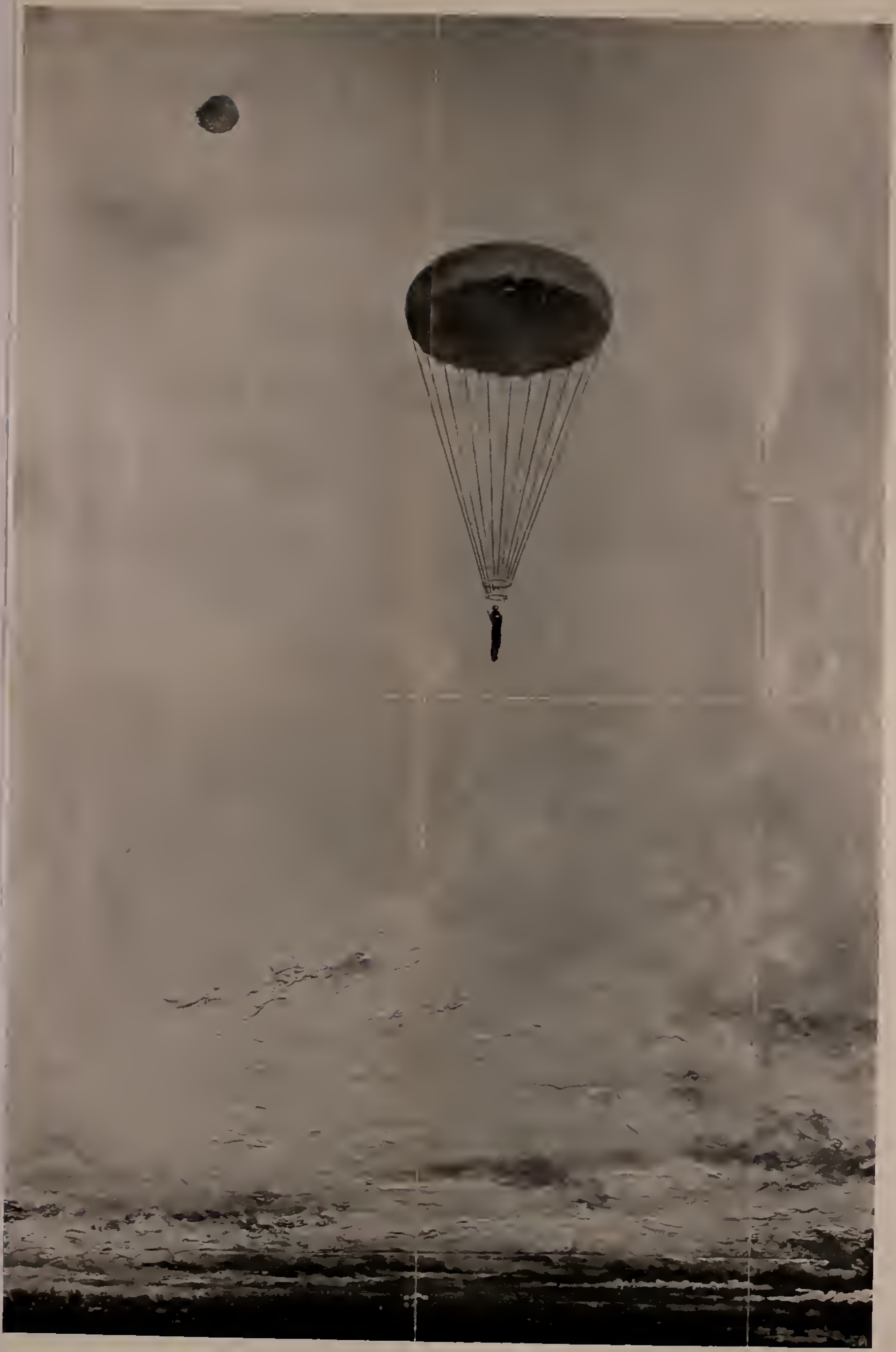
Paul Andreani of Milan ascended in a large fire Balloon on the 25th February 1784—he is supposed to have been the first to make an ascent in Italy.

On the 7th November 1836, a large Balloon ascended from Vauxhall Gardens carrying Robert Hollond, M.P., Monck Mason and Chas. Green.

At half-past seven the next morning it descended two leagues



No. 313. Boddington. The Accident to the "Albion" Balloon (see Catalogue).



No. 314. Professor Baldwin's Descent from the Clouds (*see* Catalogue).

from Weilburg in the Duchy of Nassau, having thus traversed a distance of 500 miles in eighteen hours.

This Balloon was afterwards known as the "Great Nassau Balloon."

A beautiful original water-colour drawing, by Yassam, evidently intended to depict the Balloon arriving over Weilburg (although the car has four occupants instead of three) is included in this remarkable Collection.

There are in the present Collection contemporary engravings of this famous Balloon and of the intrepid Aeronauts, besides Monck Mason's two books descriptive of the perilous journey.

Charles Green, who constructed the Nassau Balloon, was the most celebrated of English Aeronauts, and made an extraordinary number of ascents.

His first, made from the Green Park on the 19th July 1821, at the Coronation of George IV, was distinguished by the fact that for the first time coal gas was used instead of hydrogen for inflating the Balloon.

In 1828 the same Aeronaut made an equestrian ascent seated upon his favourite pony.

Green was the introducer of the guide-rope—the long rope which trails beneath the car of a Balloon.

A very fine oil-painting by "H. Williams" (H. J. Boddington) painted for the intrepid Aeronaut, Green—depicting an accident to the "Albion" Balloon, which is seen in the water—is in the Collection. Charles Green is portrayed climbing up the netting. (SEE ILLUSTRATION.)

In most of the Aeronautical pictures painted by Williams, the Balloons have subsequently been painted out, hence the great value of the picture in this Collection.

There is also an original oil-painting depicting one of Professor Baldwin's famous parachute descents. (SEE ILLUSTRATION.)

In 1863, Nadar, a Paris photographer, constructed "Le Géant," the largest Balloon ever made up to that time.

Underneath this Balloon a smaller one was suspended called a compensator, the object of which was to prevent loss of gas during the voyage.

The Car had two stories, and was in fact a model cottage in wickerwork, containing a small printing office, a photographic department, a refreshment room, and a lavatory.

The first ascent took place on Sunday, October 4th, 1863, from the Champ de Mars.

There were thirteen passengers, including a lady—the Princesse de la Tour d'Auvergne—and the two Aeronauts—Louis and Jules Godard.

This monster Balloon ascended at five o'clock and descended four hours later at Meaux. The cause of the early descent was said to have been an accident to the valve-line.

A second ascent was made a fortnight later with nine passengers, including Madame Nadar.

This time the Balloon remained in the air for seventeen hours, and descended at Nieuburg, in Hanover, four hundred miles distant.

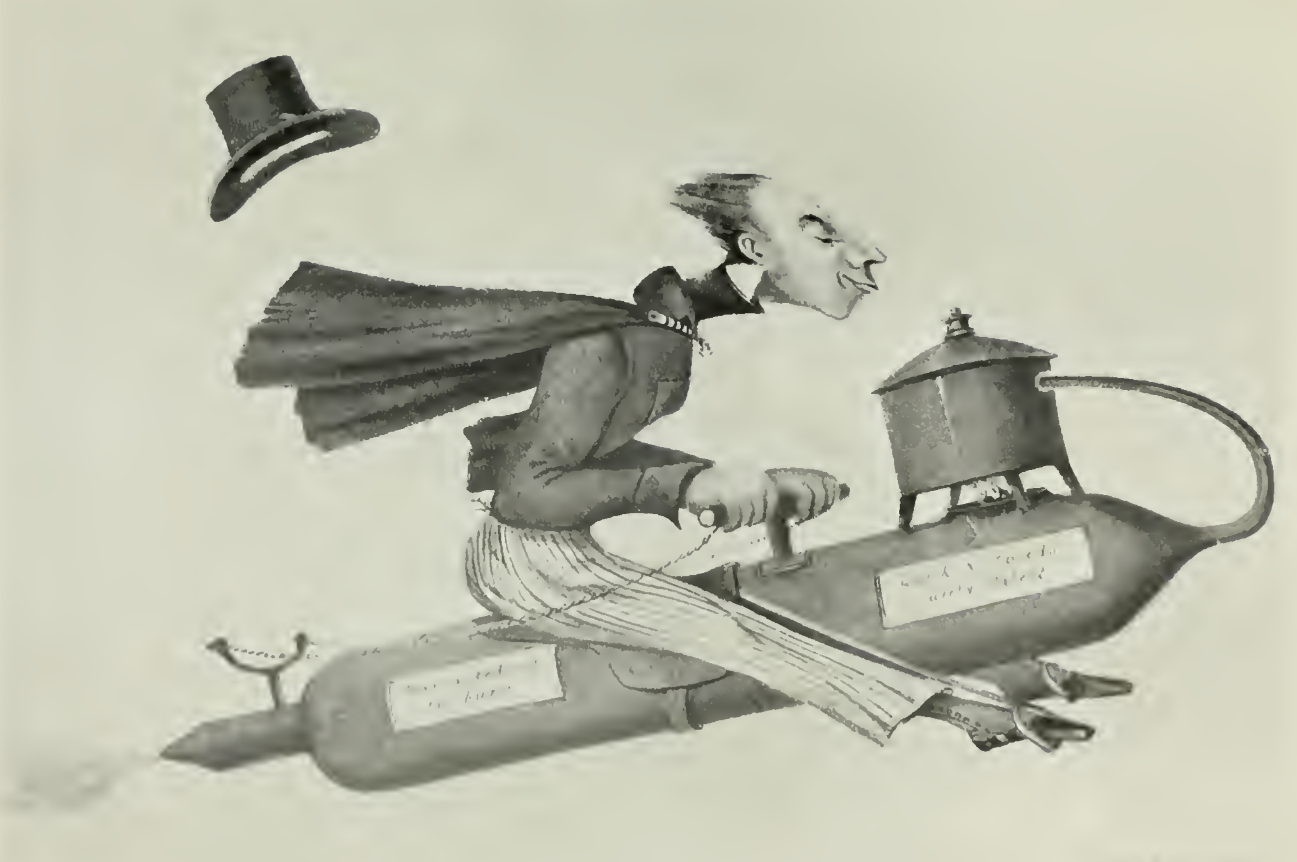
A strong wind was blowing at the time of the descent, and the Balloon was dragged over the ground for seven or eight miles. All the passengers were bruised and some seriously hurt.

The Balloon and car were afterwards brought to England and exhibited at the Crystal Palace.

Nadar started a paper called "L'Aéronaute," and published a small book on Aerostation. A presentation copy of this book, containing Nadar's signed autograph inscription, is in the present remarkable Collection, as are also four Letters in his Autograph.

Nadar's book became so popular that it was translated into English.

THE FLIGHT OF INTELLECT.



Portrait of MR GOLIGHTLY,
experimenting on Mess. Quick & Speeds new patent high pressure
STEAM RIDING ROCKET
[illegible]

No. 166 (*see* Catalogue).

In the summer of 1873 the proprietors of the " New York Daily Graphic," reviewing a project discussed by Charles Green in 1840, determined to construct a very large Balloon, and thus enable the American Aeronaut, John Wise, to realize his favourite scheme of crossing the Atlantic. The project came to nothing on account of the quality of the material with which the Balloon was constructed.

Wise's (the American Aeronaut) book upon Aerostation is in this Collection.

No Balloon voyage has as yet been made of a distance comparable to that of crossing the Atlantic.

In fact, only two voyages extending 1,000 miles are on record—that of the American Aeronaut, John Wise, from St. Louis to Henderson, N.Y., covering 1,120 miles, in 1859, and that of Count Henry de la Vaulx, from Paris to Korosticheff, in Russia—1,193 miles, in 1900.

The typewritten Catalogue (which will be sent to intending purchasers upon application) gives details of the Contents of this remarkable Collection. There are about 30 Autograph Letters, 94 Volumes of Books, 22 Original Drawings, 161 Engravings, etc., 6 Songs, 7 Medals and Tokens, 2 Original Oil Paintings, and above all a superb Snuff-box decorated with charming Miniatures attributed to Blarenbergh. Moreover, there are ten portions of various Original Balloons, including a portion of Charles Green's famous Balloon the " Albion."

83682

H

UNIVERSITY OF CALIFORNIA LIBRARY
Los Angeles
This book is DUE on the last date stamped below.

NO PHONE RENEWALS

QL OCT 06 1986
LD-URL

JUN 17 1986

Form L9-75m-7,'61(C1437s4)444

3 1158 01109 8083

Z
5063
P31

UC SOUTHERN REGIONAL LIBRARY FACILITY
D 000 941 441 8